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THE HUISACHE GIRDLER.[1]

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INTRODUCTORY.

The huisache tree is one of a variety of trees and shrubs horticulturally called "wattles" and is probably a native of Texas, although it occurs in Asia, Australia, and to a certain extent in Africa. The flowers furnish the perfume known as frangipanni and the plant is cultivated in southern Europe for the manufacture of perfume. The pods are valuable in tanning and dyeing and the plant is used as an ornamental for the formation of hedges and for shade throughout the Tropics. The bright yellow flowers which are produced in abundance and are large in comparison with those of other acacias render it one of the most beautiful of flowering shrubs of this type. The tree reaches a maximum height of about 35 feet, with a trunk diameter of about 1 foot when properly trained. The trunk is short, the branches somewhat drooping and widespreading, forming a beautiful roundheaded tree with light-green feathery foliage.

The huisache tree (*Acacia farnesiana*) of the Southwest has a number of insect enemies, but none is so injurious as a girdler which often damages young trees in such a way as to eradicate them for a time, completely severing them a few inches above ground.

During the summer of 1910, while the writer was engaged, under the direction of Dr. F. H. Chittenden, in the investigation of insects that attack the pecan, this insect, which may be called the huisache girdler, first came under observation. It seemed advisable to keep the species under surveillance in its attacks on the huisache, since it was not known but that pecan trees in the vicinity might become a center of attack at any time, for the reason that two near relatives, *Oncideres cingulata* Say and *Oncideres texana* Horn,

[1] *Oncideres putator* Thom., a beetle of the family Cerambycidæ.

Note.—This bulletin contains a technical description of an insect infesting the huisache tree of the Southwest. The form of injury is discussed and methods of control are given.

were known to injure the pecan. In any case, the huisache was of sufficient value to warrant a thorough investigation of the girdler, as it holds front rank as a shade tree in the newly developed country in the lower Rio Grande Valley. When the girdlers were first found and observed at work they were exceedingly abundant, and there was no difficulty in collecting a large number in a very short time. A shipment was immediately made to Washington, where Dr. Chittenden identified the insect as *Oncideres putator*, and later Mr. E. A. Schwarz confirmed this determination. Since the girdler was first observed, its work has become more conspicuous each successive season. In 1913, over the infested area as a whole, the beetles appeared in lesser numbers, but in places they were more abundant and the damage was greater than at any time during the four years previous. This would indicate that climatic conditions were not altogether responsible for the decrease, as some of the infested areas were near and in close proximity to one another. It is believed that natural enemies were responsible in part, if not wholly, for the lack of uniformity in distribution in 1913.

The beetles (Pl. I) possess powerful mandibles and saw with ease branches 1¾ inches in diameter, completely severing them from the main body of the tree. The eggs, as with other twig girdlers, are deposited in the severed portion of the branch, and never below where it is girdled. The writer has observed as many as 63 girdled branches from one tree, some of which measured 40 millimeters in diameter, the average ranging from 22 to 35 millimeters. (See Pl. II.) No other girdler has been observed to prune branches of this diameter, and all near relatives with which we are acquainted prune or girdle much smaller branches. *Oncideres putator*, unlike some girdlers, does not work so much in pairs, but is often found in colonies as well. The girdling is usually begun a few inches from the base of the branch selected for oviposition or just above where it joins the body of the tree or larger branch, though cases have been observed where the attack was directed to the middle of the branch. At times after the sawing has been begun by one female beetle others will begin depositing eggs before the girdling is very far advanced, apparently with little fear that the branch will not be completely girdled in due time. Young trees are often girdled only a few inches above ground, but where large trees are adjacent the beetles seem to prefer attacking the branches instead. (Pls. III, IV.)

In view of the fact that in the lower Rio Grande Valley and other parts of the Southwest where much development in farm lands is in progress, and where the huisache is oftentimes the only shade tree found upon a farmer's premises, it is thought advisable to present here for publication the life history, food plants, and habits of this girdler, with suggestions for control.

DESCRIPTION.

The beetle belongs to the family Cerambycidæ, subfamily Lamiinæ, tribe Onciderini. One of the chief characteristics of the tribe is that the front coxal cavities are angulated on the outer side and closed behind; the antennæ of the male are much longer than the body, and those of the female are as long as the body.

THE BEETLE.

With this species the antennæ of both sexes are longer than the body, and there is little difference in the antennal length in each sex. The beetles (Pl. I) are brownish gray in color, and measure in length from 18 to 24 millimeters, the average length being 22 to 23 millimeters. The mesothorax is wider than in some other species of this genus and measures on an average from 7 to 9 millimeters. In a short time after emerging from the pupal case the beetles lose more or less of their brownish-gray appearance, as the hairs covering their blackish elytra or wing covers are rubbed off, causing them to appear darker in color. This species, like its near relatives, has about one-third of its wing covers more grayish than the remaining two-thirds. The posterior margin of this densely clothed grayish band extends slightly behind the meson. The head and thorax are clothed with brownish hairs a little more densely than the wing-covers when the beetle first emerges, but it gradually loses this brownish tinge for a darker one. Ordinarily there seems to be little difference in size between the males and females. While the writer has found specimens of each sex at times smaller than those of the other, it is evident that the size depends upon the nourishment afforded the larva during its growth, as this in all probability has a bearing on the size of the adult beetle.

After making a large number of measurements it was found that about 60 per cent of the females were from 1 to 1½ millimeters longer than the males, so we may say that the body of the female is slightly larger than that of the male, although this will not be noticed by the collector without the use of a lens. On the other hand, the collector may differentiate the sexes by observing the distal joint or segment of the antennæ; in the males this segment is about twice as long as that of the female. The length of this segment in the males runs from 4 to 6½ millimeters, while in the females the average will be from 2 to 3 millimeters. This method of distinguishing the sexes does not require the use of a lens, but one should be careful to see that the distal joint has not been broken off, in the male particularly, for then the specimen will not be very different to the unaided eye from the female. The antennæ of both sexes are quite easily broken, and during the latter part of the mating season it is difficult to find a perfect specimen.

THE EGG.

The egg is of a cream-white color when first deposited and from 2.5 to 3 millimeters long, with a diameter about one-third the length. It is elliptical ovate in shape, with one end slightly more pointed than the other. Just before hatching the color changes to yellowish white, when, with the aid of a lens, the embryonic larva is visible.

THE LARVA.

The newly hatched larva, after consuming enough of the eggshell to liberate itself therefrom, measures about 2.8 millimeters in length and is of a pale white color, with the exception of the head, which is light brown, with the mandibles darker.

THE PUPA.

The pupa is white and ranges from 18 to 22 millimeters in length. Later the color changes to light brown, and just before transformation takes place to chocolate brown. When observing the pupa with a lens the dark-colored spines on each segment are very pronounced, particularly on the dorsum.

DISTRIBUTION AND HISTORY.

Oncideres putator has been recorded from the States of Arizona, New Mexico, and Texas, and from Mexico. The species is probably more injurious in Mexico than in this country, as it appears very susceptible to cold, and since breeding takes place during the fall and winter months it apparently could never become a serious pest in localities were the temperature drops much below freezing.

The following note was published in 1912[1] at the meeting of the American Entomological Society, October 24, 1912:

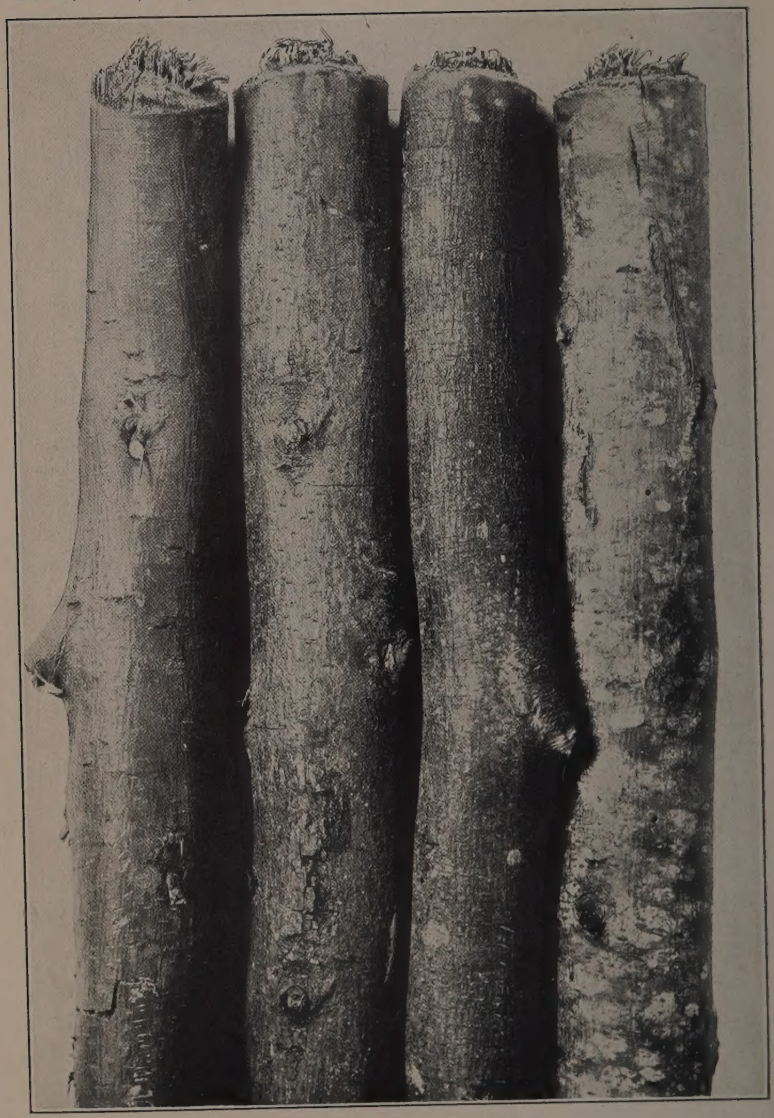
> Dr. Skinner exhibited specimens of *Oncideres putator* and said that the species was probably rare in collections. If there is a single brood, this might be accounted for by their late appearance. The specimens were taken by Rehn and Hebard in Sycamore Canyon, Baboquivari Mountains, Pima County, Ariz., October 6, 9, 1910; Palo Alto ranch, Altar Valley, Pima County, Ariz., October 6, 10, 1910; Tucson, Ariz., October 3, 4, 1910; and Snyders Hill, Pima County, Ariz., October 11, 1910.

Exact localities have also been recorded by Bates:[2] Orizaba and Jalapa, Mexico; Belize, Honduras; San Juan, Guatemala; Bugaba, Panama. Mr. Schwarz records the species from Arizona, New Mexico, and western Texas, and the writer has taken it in southern Texas and at Matamoras, Mexico. The species is native to Central America and has come into the United States from Mexico. There are very few data to be found on *Oncideres putator*, while a considerable amount

[1] Ent. News, v. 23, no. 10, p. 484, Dec., 1912.

[2] Bates, H. W. Longicornia. *In* Biol. Cent. Amer. Insecta, Coleoptera, v. 5, p. 125, Aug., 1880, and Supplement, p. 367, July, 1885.

THE HUISACHE GIRDLER (ONCIDERES PUTATOR). (ORIGINAL.)



WORK OF THE HUISACHE GIRDLER.

Portions of Huisache branches showing method of cutting off by the girdler (*Oncideres putator*) at top; also showing places where skin has been ruptured. Small holes made by secondary borers. Reduced. (Original.)

FIG. 1.—WORK OF THE HUISACHE GIRDLER EARLY IN THE SEASON. TWENTY BEETLES COUNTED ON THIS TREE. (ORIGINAL.)

FIG. 2.—TREES WHICH HAVE NOT BEEN SERIOUSLY INJURED BY THE GIRDLER, BUT NO DEAD BRANCHES ALLOWED TO REMAIN ON OR NEAR TREES. (ORIGINAL.)

FIG. 1.—ROW OF HUISACHE TREES ONLY SLIGHTLY DAMAGED BY THE HUISACHE GIRDLER. (ORIGINAL.)

FIG. 2.—STREET SCENE IN WHICH HUISACHE TREES HAVE BEEN DAMAGED BY THE HUISACHE GIRDLER. (ORIGINAL.)

WORK OF THE HUISACHE GIRDLER.

of information has been placed on record of *Oncideres cingulata* Say. It appears that some of the early writers on the Onciderini mentioned only the genus Oncideres in writing of the depredations of the insects concerned.

The first information received by the Bureau of Entomology in regard to the injurious appearance of *Oncideres putator* in this country was in 1899 at Calabasas, Ariz. The report came from Mr. Morgan R. Wise, who sent specimens of mesquite (*Prosopis juliflora*) which had been girdled by the beetle, together with the statement that this tree was much injured by the girdler. The previous year the beetles had accomplished much damage, so that this year the girdled dead twigs snapped off. It was the opinion of the correspondent that, if this condition was continued, ultimately the mesquite tree would be exterminated by being so badly crippled as to preclude the possibility of its bearing fruit. Mr. Schwarz says that the beetles damage mesquite in western Texas and New Mexico, as well as in Arizona.

The genus Oncideres has been discussed by a number of authors, but the writer has been unable to find, in literature on this group, any memoranda on the biology of the species in question. Dr. W. Muller[1] discusses the habits of Oncideres in South America, but mentions no specific characteristics, nor does he mention the occurrence of *Oncideres putator*. He states, however, that the species which occur in Brazil frequently sever branches of a diameter of 2 inches or more.

Leng and Hamilton[2] state that *Oncideres putator* is probably synonymous with *O. cingulata* Say.

The species was originally described by Thomas,[3] but no biological notes are included in the description.

FOOD PLANTS.

So far as the writer has been able to observe, the species has in southern Texas five food plants, but the huisache appears to be preferred and the other trees have never been found to be injured in any way comparable with the huisache. The following is a list of the plants or trees on which the species has been found feeding, as well as depositing:

Huisache (*Acacia farnesiana*), mesquite (*Prosopis glandulosa*), huajilla (*Acacia berlandieri*), ratama (*Parkinsonia aculeata*), and *Mimosa lindheimeri*. The host plants are here given in the order of preference by the insect, and no great amount of injury has been

[1] Müller, W. Über die gewohnheiten einiger *Oncideres*-Arten. *In* Kosmos, Zeitschrift für die gesamte Entwicklugslehre, v. 19, p. 36–38, 1886. Stuttgart.

[2] Leng, C. W., and Hamilton, John. The Lamiinæ of North America. *In* Trans. Amer. Ent. Soc., v. 23, p. 101–178, March, 1896. Oncideres, p. 140–141.

[3] Thomson, James. Physis, v. 2, no. 5, Paris, Aug., 1868. Revision des groupes des Oncidérites, p. 41–92. *Oncideres putator*, p. 81.

observed to the last three when there was sufficient huisache in close proximity to the emerging beetles. In fact, the greatest amount of damage to "huajilla" and "ratama" was noticed when collections of huisache branches containing larvæ were left near ratama and huajilla trees.

LIFE HISTORY.

The beetles begin to appear early in September and continue to emerge from their pupal cavities until the latter part of November, though most of the brood issues during the month of October. In the laboratory most of the material encaged developed adult beetles by October 12. The adults remain for several days in their pupal cells after they have emerged from the pupal cases before attempting to cut their way out of the pupal cavities through the bark of the branch. Just as soon as they have partaken of a little food, which consists of bark from the branch, and the wing covers are sufficiently hardened, copulation begins. Of specimens observed in the laboratory none began copulating or showed activity before two days after their emergence in the adult stage. This species of Oncideres, unlike its near relatives, *Oncideres cingulata* and *O. texana*, does not so frequently work in pairs. The writer has found the beetles working in pairs, but during midseason they occur to a greater or less extent in colonies. The writer has observed as many as 24 on one small tree, and two-thirds of them at times would be females. The males go from one female to another, and do not seem to possess the monogamous instinct.

While making observations on the species during October, 1910, it was decided to see how long a period was required for one unassisted female to prepare the egg cavity and deposit an egg. The first one tried deposited in 1 minute and 35 seconds, another in 4 minutes and 50 seconds, and the next in 4 minutes and 40 seconds. Observations made later show that from 1 to 5 minutes is ordinarily required for the female beetle to deposit. This, however, does not include preparing the cavity to receive the egg, for it generally requires about 10 minutes to prepare the cavity. The beetle begins this cavity by inserting both mandibles as deeply as possible into the bark of the branch that is to be girdled. After forcing the mandibles deep into the bark the beetle draws them together as nearly as she can. Then one is removed and the other worked deeply into the puncture. It is then removed and the other mandible is inserted in the same manner. Later both mandibles are inserted and a tiny chip removed. Then the work begins again with one mandible at a time, until the cavity is prepared to receive the egg. The beetle then reverses its position and forces the ovipositor into the cavity as deeply as possible. Shortly the egg can be seen leaving the body of the beetle. After the egg is inserted the beetle frees herself by withdrawing the

ovipositor, one side at a time, and then she searches for another suitable location. The eggs are ordinarily placed between the layers of bark, and it may here be stated that this species does not deposit particularly about buds or at the base of smaller branches, but may lay her eggs anywhere along the branch girdled. It also might be added that, unlike some, this species of Oncideres does not make transverse incisions in the bark, presumably to prevent the growth of the branch from crushing the egg.

There is, in addition, a difference from *Oncideres cingulata* and *O. texana* in the way this species leaves the egg after deposition, in that only a very slight gluey excretion is made in sealing the opening to the egg cavity, and at times there is none at all. This waxy secretion is very conspicuous with the work of the two smaller species.

The larva feeds along gradually, leaving in its burrow behind excrement and castings well packed, which may prevent attack of an enemy from the rear. It has been observed that when a branch not completely severed remained in the top of the tree the young larvæ would often perish, presumably for lack of moisture. On the other hand, the writer has noticed branches that remained several feet above ground all season and which developed beetles during October. It thus appears that it will depend upon the amount of rainfall and climatic conditions generally as to whether the mortality of the larvæ is high in the suspended branches—well up in the tops of the trees. If there should be a moderate rainfall during the winter and spring months, it is thought that the mortality in these suspended branches would be very low, but on the other hand if it should be dry, the mortality would be high. While the larva will stand a very dry atmosphere for several months, its growth will not be as rapid as where there is sufficient moisture to permit constant feeding. Larvæ that have been checked in growth from lack of moisture develop very rapidly when placed in more humid surroundings and appear to obtain their growth just as soon as when left under normal conditions. They could not well do otherwise and thrive in the climate where they have been found most numerous. There is a limit, however, to the amount of moisture the larvæ can stand, for in one instance in the laboratory the mortality was about 70 per cent, and it could be attributed to no other cause than an excess of water. The duration of the larval period is approximately 42 weeks under ordinary conditions, though under the most favorable conditions they may develop in 39 or 40 weeks. Before transforming to pupa the larva prepares a pupal cavity or cell by drawing about it all castings and thus surrounding itself with more or less of a wall that would be difficult for any insect enemy to penetrate. The larva then cuts a hole into the bark and transforms to the pupa. During the growth of the larvæ in the branch

they produce a grinding noise that can be heard several feet away, and when the branch is disturbed this noise is more pronounced. The pupæ in turn make a somewhat similar noise when disturbed, and for this reason one must raise the bark covering in order to know just when transformation takes place.

Before the pupal stage of this species could be had the writer was transferred to Indiana, and the material was taken there in order to obtain the pupæ. The branches were examined frequently during the months of June and July, but no pupæ were observed until August, and the first adult beetle emerged September 15. The duration of the pupal stage is approximately four weeks, with an average mean temperature of 72.5° F.

There is only one generation of this beetle each year, approximately 12 months being required for the life cycle from egg to adult.

LONGEVITY.

The beetles that emerged in the laboratory were kept in confinement without fresh food and lived from 4 to 12 days, while those that were captured, confined in the insectary, and furnished proper food lived from 10 to 21 days, the males dying from 1 to 5 days in advance of the females.

NATURAL ENEMIES.

There are several species of parasites that attack the eggs and larvæ of *Oncideres putator*, one species in particular attacking both egg and larva. The following were reared February 3, 1915, at Brownsville, Tex.: *Chryseida inopinota* Br., *Eurytoma* sp. (Chttn. No. 1921), *Caenophanes* sp. (Chttn. No. 1922), a pteromalid (Chttn. No. 1923), and *Meteorus* sp. (Chttn. No. 1924). It is thought that the larvæ have one or more predaceous enemies, but none has been observed to this writing. It is believed that the southern downy woodpecker (*Dryobates pubescens*) and probably also the Texas woodpecker (*Dryobates scalaris bairdi*) attack the larvæ. While neither of these birds has been found with larvæ, they have been observed at work on branches that contained numerous larvæ of this insect and have left empty chambers behind.

Table I shows something of the mortality early in the season.

TABLE I.—*Mortality of the huisache girdler, based on examinations made January 8, 1913.*

Number of branch.	Diameter of branch (millimeters).	Number of eggs.	Number of live larvæ.	Number of dead larvæ.
I	26	11	0	0
II	30	0	58	3
III	35	19	153	2
IV	28	0	197	14
V	32	0	173	17
VI	37	7	52	0

On January 13, 1913, four prunings of huisache were stripped of bark, and the following table made:

TABLE II.—*Infestation of the huisache girdler by parasites, based on examinations made January 13, 1913.*

Number of branch.	Diameter of branch (millimeters).	Number of eggs.	Number of living larvæ.	Number of larvæ parasitized.
I	36	0	363	11
II	30	0	104	5
III	25	0	79	6
IV	38	59	135	0

These tables give the degree of infestation to a single branch and the mortality of the larvæ at a very early date. The parasites of the larvæ are more numerous a little later in the season, although the egg parasite appears even as early as December 1. This parasite is more effective against the larvæ before they approach a size more than two-fifths of an inch in length; although it attacks the larvæ throughout the season it does not appear in as large number then as it does early in the season.

METHOD OF CONTROL.

Since this insect spends at least 10 months in the severed branch during the egg, larval, and pupal stages, its control is only a matter of collecting the pruned branches and destroying them by burning. This would not be a laborious task, as the girdled branches are so large that it is not difficult to locate them, and as the species does not appear to migrate very rapidly to new territory, this method would nearly eradicate the species in isolated localities, at least, in one or two seasons' time, taking it for granted that a few branches might go unnoticed. (See Pl. III, fig. 2.) The work of burning the branches could best be done from the first week of January to the first of August, as the writer has not observed the laying of any eggs as late as January 1. As the huisache wood burns readily, it should be comparatively easy to collect and destroy pruned branches from a large number of trees in a comparatively short time. In addition to this measure, the beetles might be collected by hand where one has only a small number of trees to guard against this girdler, and in this way the trees could be protected before any damage had been done.

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